INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2004/001891

A. CLASSIFICATION OF SUBJECT MATTER
IPC[7]: C12N 15/31; A61K 38/16; A61K 39/108; A61K 35/74; C12N 1/20; C12Q 1/68; G01N 33/569; C07K 14/24; A61K 39/02; A61P 31/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC[7]: C12N 15/31

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base, and, where practicable, search terms used)
Delphion; MEDLINE; CAplus; BIOSIS - Search terms: E. coli;Citrobacter; type III secretion system; virulence factors; p54; Nle
DGENE; GenBank; UniProt/TrEMBL - Search on sequence ID NOs: 1 to 3, and 22 to 24.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	DENG, W. et al., "Dissecting virulence: Systematic and functional analyses of a pathogenicity island", PNAS, March 2004, Vol. 101, No. 10, pages 3597-3602. see whole document	1 to 85
P, X	GRUENHEID, S. et al., "Identification and characterization of NleA, a non-LEE-encoded type III translocated virulence factor of enterohaemorrhagic Escherichia coli 0157:H7", MOL MICROBIOL, March 2004, Vol. 51, No. 5, pages 1233-1249. see whole document	1 to 85
P, X	MUNDY, R. et al., "Identification of a Novel Citrobacter rodentium Type III Secreted Protein, EspI, and Roles of This and Other Secreted Proteins in Infection", INFECT IMMUN, April 2004, Vol. 72, No. 4, pages 2288-2302. see whole document	1 to 85
P, X	MARCHES, O. et al., "Enteropathogenic and enterohaemorrhagic Escherichia coli deliver a novel effector called Cif, which blocks cell cycle G2/M transition", MOL MICROBIOL, December 2003, Vol. 50, No. 5, pages 1553-1567. see whole document	1 to 85
X	US 6365723 B1 (BLATTNER, F.R. et al.) 2 April 2002 see whole document and SEQ ID NO: 66	1 to 7, 49 to 52, and 67 to 85
X	"hypothetical protein Z6024" UniProt/TrEMBL database 1March 2002 Accession number Q8XAJ5	1 to 3, 74, and 75

Further documents are listed in the continuation of Box C. X Patent family members are listed in annex. X

* Special categories of cited documents :
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international-type search
31 January 2005 (31-01-2005)

Date of mailing of the international-type search report
07 March 2005 (07-03-2005)

Name and mailing address of the ISA/CA
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2004/001891

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2002355074 A2 (UNIV TSUKUBA) 24 January 2002 see abstract, SEQ ID NO: 337 and 393	1 to 7; 49 to 58; and 67 to 85
A	WO 02/053181 A1 (FINLAY, B. et al.) 11 July 2002 see whole document	4 to 6, 53 to 61, and 82
A	KRESSE, A.U. et al., "Characterization of SepL of Enterohemorrhagic Escherichia coli", J of BACTERIOLOGY, November 2000, Vol. 182, No. 22, pages 6490-6498. see page 6495 and Figure 6	4 to 6, 53 to 61, and 82
A	LI , Y. et al., "Human Response to Escherichia coli O157:H7 Infection: Antibodies to Secreted Virulence Factors", INFECTION AND IMMUNITY, September 2000, Vol. 68, No. 9, pages 5090-5095.	4 to 6, 53 to 61, and 82

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CA2004/001891

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6365723 B1	2 April 2002	US 20030023075 A1	30 January 2003
JP 2002355074 A2	24 January 2002	NONE	
WO 02/053181 A1	11 July 2002	US 20020160020 A1	31 October 2002
		JP 200451633 T2	3 June 2004
		EP 1349570 A1	8 October 2003
		CA 2433792 AA	11 July 2002
		BR 0206312 A	17 February 2004

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2004/001891

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims 1 to 85 (partially) as they relate to NleA nucleic acid and amino acid sequences (SEQ ID NOs: 1 to 3, and 22 to 24).

2. Claims 1 to 85 (partially) as they relate to NleB nucleic acid and amino acid sequences (SEQ ID NOs: 4 to 7, 60, and 25 to 29).

3. Claims 1 to 85 (partially) as they relate to NleC nucleic acid and amino acid sequences (SEQ ID NOs: 8 to 10, and 30 to 32).

4. Claims 1 to 85 (partially) as they relate to NleD nucleic acid and amino acid sequences (SEQ ID NOs: 11 to 13, and 33 to 35).

5. Claims 1 to 85 (partially) as they relate to NleE nucleic acid and amino acid sequences (SEQ ID NOs: 14 to 17, and 36 to 39).

6. Claims 1 to 85 (partially) as they relate to NleF nucleic acid and amino acid sequences (SEQ ID NOs: 18 to 21, and 40 to 43).

7. Claims 1 to 85 (partially) as they relate to NleG nucleic acid and amino acid sequences (SEQ ID NOs: 61 and 73).

8. Claims 1 to 85 (partially) as they relate to NleH nucleic acid and amino acid sequences (SEQ ID NOs: 62, 63, 74, and 75).

9. Claims 1 to 85 (partially) as they relate to EHEC Z2076 nucleic acid and amino acid sequences (SEQ ID NOs: 64 and 76).

10. Claims 1 to 85 (partially) as they relate to EHEC Z2149 nucleic acid and amino acid sequences (SEQ ID NOs: 65 and 77).

11. Claims 1 to 85 (partially) as they relate to EHEC Z2150 nucleic acid and amino acid sequences (SEQ ID NOs: 66 and 78).

12. Claims 1 to 85 (partially) as they relate to EHEC Z2151 nucleic acid and amino acid sequences (SEQ ID NOs: 67 and 79).

13. Claims 1 to 85 (partially) as they relate to EHEC Z2337 nucleic acid and amino acid sequences (SEQ ID NOs: 68 and 80).

14. Claims 1 to 85 (partially) as they relate to EHEC Z2338 nucleic acid and amino acid sequences (SEQ ID NOs: 69 and 81).

15. Claims 1 to 85 (partially) as they relate to EHEC Z2339 nucleic acid and amino acid sequences (SEQ ID NOs: 70 and 82).

16. Claims 1 to 85 (partially) as they relate to EHEC Z2560 nucleic acid and amino acid sequences (SEQ ID NOs: 71 and 83).

17. Claims 1 to 85 (partially) as they relate to EHEC Z2976 nucleic acid and amino acid sequences (SEQ ID NOs: 72 and 84).

18. Claims 1, 2, 4 to 7, 21 to 60, 62 to 73, and 81 to 85 (partially) as they relate to amino acid SEQ ID NO: 59.

The description fails to disclose that the polypeptides and corresponding nucleotide sequences claimed share a common activity and structure. The fact that the respective "nucleic acid molecule encoding a polypeptide" is not located in the locus of enterocyte effacement and that the proteins are secreted is not sufficient to establish unity of invention since no functional relationship has been established among the different sequences claimed. Further, secreted effectors such as those encoded within the locus of enterocyte effacement are known in the art, e.g. Tir, EspG and EspH. Moreover, these secreted effectors have been characterized with separate and distinct biological activities, for instance, as acknowledged by applicant on pages 2 and 3 of the instant description. Consequently, there is no special unifying technical feature shared amongst the above identified groups of inventions and unity of invention is lacking.